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INTRAVENOUS GLUCOSE THERAPY.*

THOS. TRUELSEN, M. D.,
Tampa, Fla.

Introduction: Intravenous therapy is not an old method of medication. The boldness with which it has been pursued more recently has given some cause for alarm, and several editorial writers have warned against the promiscuous use of this method. Some intravenous therapy, however, seems to be very well established and will probably endure. Normal saline solutions used intravenously seems to have stood the test of time. Hypertonic saline solution is a latter development; and of a more recent period is the use of hypertonic glucose solution. Of this I wish to speak this evening.

Action: The one large group of seriously ill patients especially benefited by hypertonic glucose injection is the toxic group with its symptom complex of temperature, rapid and feeble pulse, hot and dry skin, dry tongue, lethargy or restlessness. Important to recognize in connection with this group of symptoms—and I want to stress is especially—is that the process of dehydration plays a very serious role, and that this process is especially potent for evil because least appreciated and consequently neglected in treatment. To recognize that the toxic symptoms are in part due to, or at least greatly aggravated by the process of dehydration, at once puts us on the alert and the liberal use of hypertonic glucose solution intravenously in an advantageous combative position. The introduction of several hundred cubic centimeters of water into the bloodstream immediately tends to correct the dehydration. By the process of absorption, or extraction of fluid from the tissues, the bloodstream again regains its normal state of isotonicity, the tissue cells are relieved and again enabled to absorb fluid and nourishment. In other words, an efficient effort has been made to supply the elements for and to inaugurate helpful metabolic changes. It has been repeatedly demonstrated and confirmed that following an injection of glucose solution there is a temporary increase of the total of sugar in the circulation, and that the injected sugar rapidly passes out of the blood into the tissues and there undergoes chemical changes—polymerization and oxidation. During its stay in the bloodstream the blood volume rises and a state of hydremic plethoria develops. This is shown by a fall in the Hb. percentage and a coincident fall in the blood-sugar percentage following an initial rise. When the last of the injected glucose passes into the tissues the extra water held in the bloodstream is to a large extent discharged into the urine, thus eliminating many toxins. This whole phenomenon differs essentially from that obtained with inorganic salt solutions because such salts pass into the tissues, but when once there are not destroyed and offer no nourishment. There is therefore the possibility of salt accummulation in the tissues with water retention. All the processes that take place in the economy after an intravenous injection of hypertonic glucose solution are not to be explained at this time, and in offering the above explanation it is not presumed that it is exhaustive or even comprehensive; it is, however, adequate for a working understanding, I think, if we bear in mind that intravenous injections of hypertonic glucose solution offer the economy urgently needed water and immediately available food, and that the hypertonicity of the solution inaugurates adsorption of waste materials and toxins, and helps to eliminate these through the kidneys.

Uses: The intravenous use of glucose solution has effected a distinct progress in therapeutics. Its usefulness is being more and more recognized and extended as is attested by the frequent references to it in the current literature. If you will bear in mind that its use supplies water and immediately available nourishment, that its hypertonicity disimpregnates the tissues of waste products and toxic substances, and that

*Read before the Hillsborough County Medical Society, November 3, 1923.

through diuresis it will eliminate toxins, you will readily conceive its usefulness in conditions such as prolonged fevers, exhaustive diarrheas, toxic states from drug poisonings, or anesthetics, or alcoholic excesses. Surgeons find it very useful both before and after operation in bad risks, to prepare patients for operation, and to tide them over in various post-operative conditions. It has been used with advantage after severe hemorrhages—in acidosis, etc. Pneumonia cases are much better taken care of with glucose injections than without.

In the toxemias of pregnancy intravenous glucose therapy has decided advantages. You all know that "there have been innumerable ingenious theories advanced to explain the origin or source of these various toxemias. It may be conceded for the time being that anyone or any combination of these theories may be involved, whether it be the idea that the toxemia is of gastro-intestinal origin, the result of disturbance in the glands of internal secretion, or of fetal origin. Certain it seems that the pathologic process of the toxemia is dependent on a carbohydrate deficiency in the maternal organism, particularly in respect to the impairment of physiologic activity of the liver when unduly depleted of glycogen—and that the liver and its functions play an important part in the patient's ability or inability to recover. Glucose solution injected intravenously serves rapidly to restore the depleted and damaged liver cells, being stored as glycogen. The liver is thus aided in its fight against the toxins of pregnancy. It must be emphasized, however, that the usual rational methods of treating these cases are not to be abandoned because glucose is offered as a therapeutic measure.

Effect: The effects of a concentrated glucose injection intravenously sometimes become apparent very soon after the injection. A rapid, feeble pulse becomes slower and stronger; a nervous, anxious and restless patient becomes more comfortable and often goes to sleep. Soon the urinary output is increased and the patient requests water and often food. The skin and tongue become moist, and the temperature is lowered. In short, a seriously ill patient has made a happy turn and now presents many hopeful features and often a state of well-being.

Not always is so great a benefit realized after one injection, nor is it necessarily lasting; success may follow only after repeated injections. No definite rule can be given for the repetition of the injection or the number of injections required. If, however, you bear in mind that the injections are given to overcome a definite symptom group or a condition, or to maintain success already achieved, you will be readily guided in their repetition to meet the needs and response of the patient. Some acutely ill cases may require two or three injections during the twenty-four hours; others may get along with only one a day or even with less.

With chronic cases my experience is practically limited to tuberculosis. During a dispensary service all cases received one injection a week. Upon inquiry it was ascertained that the patients noticed the beneficial effects wearing off about the fourth of fifth day after injection.

The strength of the solution employed varies with different users. You will find recorded in the literature percentages varying from five to thirty, and a 50 per cent solution in comparatively small quantities is reported as used with good results in decompensated heart troubles with edema. The strength of the solution seems to be arbitrarily chosen by the different users. I have found no reasons given for a choice. A 5.1 per cent solution is isotonic with the blood stream and this strength is indicated when it is intended to replenish speedily a lost volume of blood with an artificial serum as after a severe hemorrhage. Stronger solutions furnish more nourishment; from 100 to 300 calories can be supplied with each dose without having to go through the ordinary digestive processes—storage in the liver as glycogen and reconversion into glucose again before it can be used by the tissues.

As does the strength, so does the quantity of the injected solution vary, 200 to 300 c.c. being a fair average. Children receive proportionately less. Special indications or desperate cases may demand larger doses.

Various drugs and preparations may be conveniently incorporated into the solution if deemed expedient. The possibilities of this procedure as affecting medication are almost without limit. I call your attention to bicarbonate of soda, digitalis, strychnin and quinine; also to serums such as antipneumococcic, antistreptococcic, and antitetanic. For these incorporations the glucose solution is a much more rational medium than a saline, because it is to a greater degree physiologically potent.

Reactions: Intravenous injections of glucose solutions are sometimes followed by reactions. These reactions are similar to those sometimes noted after the injection of other substances such as distilled water, physiologic sodium chlorid solution, blood, or foreign proteins. They are called protein or anaphylactoid reactions. In from a few minutes to half an hour a chill comes over the patient, accompanied by a rise in temperature of from 2 to 3 degrees, followed often by a profuse sweat, and by prostration and weakness. Usually within 24 hours these phenomena disappear. Though decidedly unpleasant to the patient no harmful results are noted; and some authors claim these reactions have a definite therapeutic value.

As stated, these reactions are called protein reactions and it has been suggested that the failure to remove all foreign matter from the solution used was responsible for them. This explanation has never been quite sufficient.

In a recent article by Williams and Swett, entitled, Hydrogen Ion Concentration Studies, is offered a much more satisfactory explanation, one based on an exact chemical study.[1]

In attempting to understand the term hydrogen ion concentration it is necessary to remember that it is the hydrogen in a substance that is the cause of acidity, and that weak acids are weak, and strong acids are strong, just in proportion as their hydrogen is capable of being dissociated, or split off, from the molecule when the latter substance is dissolved in water. Thus H. Cl. is a strong, or very corrosive, acid because the combined hydrogen is so readily freed, or split off, or ionized, from the chlorin to enter into other combinations; whereas acetic acid is a weak acid because the incorporated hydrogen is only to a slight extent capable of being split off, or dissociated, or ionized. Now when we say a solution has a certain hydrogen ion concentration it should mean to us that it has hydrogen in weak combination, readily dissociated, or ionized, to form other combinations. The substances that form new combinations with the hydrogen, or absorb the hydrogen ions into their molecule, are called buffers because they absorb, or "soak up," so to speak, the shocks or damage that the corrosive hydrogen is capable of producing. The authors previously referred to believe there is a relationship between these so-called protein reactions and the hydrogen ion concentration of the injected fluids. They advance the hypothesis that when fluids of a much higher or lower concentration than that of the blood is introduced into the circulation at a rate or in an amount in excess of the capacity of the blood to buffer or neutralize, reactions will occur. They base their theory on clinical observations and the analysis of fluids, the intravenous use of which was followed by reactions. In their study of distilled water they found that it becomes acid almost immediately after distillation, owing chiefly to the absorption of carbonic acid gas from the atmosphere, which has a high degree of penetrability. Storage conditions made very little difference, and age increased the acidity. Old stock distilled water is quite likely to be very acid, and its use in the preparation of medicines or chemicals for intravenous use is very questionable, if not dangerous.

The result of the study of the hydrogen ion concentration of normal salt solution is embodied in the following comments: "It is evident from our tests that when the common methods of making physiologic sodium chlorid solution is employed, namely, dissolving so-called chemically pure sodium chloride in stock distilled water, a highly acid solution may result which might prove harmful in clinical use. This acidity may be due to the salt, or to the distilled water, or to both. It is obvious that a salt solution which is physiologically normal for the body must not only be correct in salt content but also in hydrogen ion concentration. Physiologic sodium chlorid solution may easily be rendered safe for therapeusis by proper buffering."

Results similar to those obtained in their investigation of distilled water and of sodium chlorid solutions were obtained in their investigation of glucose solutions. Freshly prepared solutions were acid. Standing, and boiling and auto-claving, increased the acidity concentration. Only slight differences in these respects were noted in the examination of different brands of glucose. After correctly buffering or adjusting their glucose solutions, they had no more reactions.

To correctly buffer intravenous solutions it is convenient to use tablets or solutions prepared for this purpose by the Pyrolectric Instrument Company, Trenton, N. J. Buffering should be done just previous to using solutions.

[1] Williams, John R., Madeleine Swett, Hydrogen Ion Concentration Studies. J. A. M. A., April 8, 1922.

PREPARATION OF GLUCOSE SOLUTIONS.

To prepare a glucose solution secure from your druggist a pound bottle of Dextrose powder and dissolve in a fair quantity of hot water. Any good grade of water my be used. The resultant solution must now be filtered, perhaps twice, because at this stage all dextrose solutions contain some detritus. To the filtrate is added a sufficient quantity of water to make the percentage of glucose solution desired. The solution is now divided into glass flasks of convenient size, e.g., 250 or 300 c.c., and sterilized, either by boiling or autoclaving several times, and set aside for future use. Before using the solution must be heated to blood temperature. In emergencies a very suitable intravenous glucose solution may be prepared from Caro Corn Syrup.

THE COMPLICATIONS OF NONPENETRATING TRAUMATISM OF THE THORAX.

E. W. BITZER, M. D.,
Tampa, Fla.

The rapid increase in automobile accidents has added immensely to the frequency of thoracic trauma. It is estimated that, at the present rate for the year of 1923, one in every seventy inhabitants of the United States will have been injured or killed in this manner. When penetrating wounds are not considered, injuries due to falling or crushing are usually the etiological factors in thoracic traumatism. Often there is a complete absence of external evidence of injury.

The internal complications may be divided into two groups: the purely traumatic in origin, hemorrhage and pneumothorax, and those due to secondary infection.

Hemorrhage is the commonest complication, and is usually due to injury of an intercostal artery from a fractured rib. The parietal pleura is punctured as a rule and bleeding occurs into the pleural cavity. The visceral pleura may be punctured and a hemo-pneumothrax result. Hemorrhage from a tear in the lung rarely occurs owing to its elasticity and to collapse. Rarely the internal mammary artery may be the site of hemorrhage.

The symptoms of hemorrhage in such injuries are usually those of mild shock, pallor, sweating, faintness, rapid pulse, rapid respirations, low blood pressure and cold extremities, usually followed by fever of varying degrees, depending upon the severity of the hemorrhage. Bloody expectoration is likely to occur when the lung is injured. Fatal hemorrhage is rare from rupture of an intercostal artery. Even in prolonged bleeding, a positive pressure is created in the pleural cavity, that stops the hemorrhage. Collapse, due to pressure on the viscera, does not occur, on account of the gradual filling of the cavity with blood.

After the initial stage, respiratory embarassment with rapid respirations and cyanosis may be noted, where the hemorrhage is large. Separation of the blood into an upper serous portion and lower solid clot occurs. The clot usually occupies the lower posterior part of the pleural cavity.[1]

Physical examination shows flatness in the base with signs of compression of the lung at the upper margin, prolongation of expiration, with a tendency to increase of voice transmission, which is more marked in some cases and may be mistaken for consolidation of the lung. A paravertebral triangle may be present. Where the hemorrhage is large, the heart and mediastinal contents are displaced to the opposite side. There is bulging of the chest and restricted movements. The physical findings may be modified by the presence of pneumothorax of varying degree.

Pneumothorax may be the only complication of thoracic traumatism. This may be produced by a fragment of broken rib puncturing the lung. It may be found occasionally, where the ribs are not fractured. A sudden violent compression may rupture the lung. Cases have been reported from violent coughing. It is probable that this condition is of more frequent occurrence than is usually supposed, and that many cases heal undiagnosed. Spontaneous healing is the rule. The lung is collapsed, and the contraction of the elastic tissue is sufficient to close the opening and healing is prompt. Occasionally, this is not the case, air continues to enter the pleural cavity, and the pneumothorax may continue for months.

The symptoms are those of shock in the beginning with pain and respiratory embarassment. Later they may be surprisingly slight, in cases of persistent pneumothorax. In cases of long standing, respiratory embarrassment after exercise may be the only symptom.

Physical examination shows a tympanitic note on percussion. The heart is displaced to the

[1]Norris and Landis: Diseases of the Chest and the Principles of Physical Diagnosis. 1920.

opposite side. There may be bulging of the thorax, and the excursion of the base is absent owing to the displacement of the diaphragm downward. Distant or absent voice and breathing sounds are noted, and a positive coin test. Occasionally, air may be heard entering the pleural cavity through the rent in the lung.

Cases presenting a secondary rise of temperature or a continuation of the initial temperature are usually those in which infection has occurred. Such manifestations may be either acute, subacute or chronic in type. Acute symptoms, where hemorrhage has occurred, are suggestive of empyema. It is possible that abscess of the lung may occur but it is rare. Spontaneous drainage may occur through the bronchi or chest wall, or the virulence of the infection may subside, with encapsulation, sterilization, and gradual absorption. The latter is usually associated with extensive scar tissue formation, which is likely to seriously curtail the functional capacity of the affected lung.

The symptoms are briefly, cough, scant expectoration, pain, fever, rapid pulse and respiration and leucocytosis.

Physical examination does not, as a rule, disclose anything distinctive. The aspirating needle and Rœntgen examination are valuable in the location of pus, but at times both fail.

In other cases following hemorrhage, the symptoms may be mild, but with unmistakable evidence of pleural infection, often distant from the base. A satisfactory though slow recovery occurs. This is doubtless due to the type of infecting agent or to the resistance of the patient.

REPORT OF CASES.

CASE 1.—February 3, 1923. Male, 43 years of age.

Family History: Negative.

Past History: Has had typhoid, scarlet fever, tonsilitis, nervous breakdown ten years ago, leutic infection fourteen years ago. He had a negative Wassermann three years ago. Habits are good.

Present Illness: In June, 1922, was in an automobile accident. Another occupant weighing 200 pounds fell on his chest. Following this he has been short of breath to a marked degree after exercise. He has not been able to walk more than two blocks without discomfort. There is no cough. Since October, 1922, has had epigastric discomfort two hours after eating.

Examination showed a well-nourished individual, healthy in appearance, weighing 143 pounds. Muscular development fair, posture erect, teeth, gums, throat, and thyroid are negative. Pupils are equal and active to light. Knee jerks are equal and active. Temperature is 98.6, pulse 72 and normal rhythm. Respiration 20. Blood pressure 120/80. Hemo. 68 per cent. Wassermann and urine are negative.

The abdomen is tender at Morris' and McBurney's points and in the liver region. The heart and mediastinal structures are displaced to the right. The heart sounds are normal. The left chest is tympanitic on percussion. The movement is limited, and the excursion of the left base is very slight. Voice and breathing sounds are absent except in the axillary region, where a distant blowing, amphoric in type, is heard. Voice sounds are louder in this region, which doubtless corresponds to the tear in the lung. The coin test is positive.

A diagnosis of pneumothorax was made and confirmed by roentgenograms.

CASE No. 2.—Male, age 15, white.

Past History: Unimportant. February 8, 1923, was injured by a fall, which was followed by pain if the left abdomen, chest and shoulder. He continued to complain of pain with an occasional day in which the temperature was elevated. On March 7th he had a chill followed by fever. On March 24th was up with temperature of 102, pulse 120, respiration 30, and complaining of severe abdominal pain. He was admitted to the Bayside Hospital March 28, 1923.

General appearance that of thin youth, seriously ill. He complains of severe pain in left abdomen and chest and at times in the left shoulder. Chest examination showed flatness on percussion in an area corresponding to the lower lobe of the left lung, with absent voice and breathing sounds. Along the upper margin of the flatness in the back, the voice and breathing sounds were increased suggesting compression of the lung. A paravertebral triangle was present.

Conclusions: Hemorrhage following injury, with infection and probably empyema. An exploratory puncture was suggested.

March 28, 1923, white count, 18500, Polys. 85 per cent. The urine showed a trace of albumin and a few granular casts. On March 30th, two punctures were made between the 9th and 10th ribs without success. On April 16th, Hemo. 59 degrees, R. C. 3,408,000, W. C. 20,300, Polys. 77 per cent. On April 21st, another puncture

was made in the mid-axillary line. A small amount of sero-sanguineous fluid was withdrawn, which was negative for T. B. and showed no growth on culture. The temperature showed a daily rise of from 101 F. to 103 F. between March 28th and April 25th, the pulse varied from 90 to 150 and the respiration from 20 to 40. On April 20th, he began almost continuously to expectorate blood-streaked purulent material. This continued, gradually decreasing in amount until May 14th. Following the onset of expectoration, the patient improved gradually, and was discharged cured May 25th.

The final diagnosis was, hemothorax, localized empyema with rupture into the bronchi.

CASE No. 3.—Male, age 45, family history negative, past history—pleurisy of right chest, 12 years ago.

Present Illness began August 1, 1923, following an automobile accident. The patient in jumping from a car, going at high speed, fell on his left side, injuring the arm and breaking four ribs in the lower left thorax in the auxillary region. Spent 18 days in a hospital, with a diagnosis of pneumonia immediately following the accident. On September 4, 1923, the only complaint was pain in lower left chest, both sides, more marked in the back, and worse on the left side, aggravated by deep breathing and recumbent position. He has a slight cough and mucopurulent expectoration. The left shoulder is stiff and he is unable to use the left arm and hand in a normal manner.

Examination showed a well-nourished individual, normal in appearance, weighing 190 pounds. The temperature is 98.8, pulse 84, respiration 26, blood pressure 135/90. The sputum is negative for T. B.

The right apex is dull on percussion, with distant voice and breathing sounds. There are no rales in this region. There is an increase in the area of dullness on both sides of the sternum, with numerous rales in the right root region. The left base, posteriorly, is flat to a point one inch above the angle of the scapula, extending around the chest to the fifth rib in front. There are a few moist rales in the lower back on deep breathing. Distant broncho-vesicular breathing and increased voice sounds are heard at the upper margin of flatness in the back, suggesting lung compression. The physical findings were confirmed by roentgenograms.

It seems probable that there has been a hemorrhage into the left pleural cavity, with the remains of the clot still present in the base. It is possible that there was pneumonia following the injury. However, this is a rare complication and seems unlikely. It is likewise possible that a sterile, localized empyema may be present that is undergoing slow absorption. It is more probable, however, that a low-grade infection is present, producing an apical and mediastinal pleurisy, with a blood clot and pleural involvement at the left base.

CONCLUSIONS.

First. The complications of thoracic injuries, of interest to the internist are Hemothorax and Pneumothorax.

Second. Infection is limited to the pleural cavity, as a rule, and may be of any degree of severity, purulent or otherwise.

INSULIN IN THE TREATMENT OF DIABETES MELLITUS.

WILLIAM C. BLAKE, B. S., M. D.,
Tampa, Fla.

When Dr. F. G. Banting and his co-workers in Toronto announced that the extract which they had obtained from the islets of pancreatic tissue had been used successfully in the treatment of seven patients, a new hope was held out to the host of diabetic sufferers and new impetus given to the study of this disease. Subsequent work has bourne out the claims of these investigators and bears witness to their epoch-making achievement.

Insulin is not a cure for diabetes. We must keep clearly in mind the fact that the specific harmone elaborated by the islet tissue of the pancreas is necessary for the combustion and utilization of carbohydrate foodstuffs. Depancreatized animals immediately become diabetic with a rapidly ascending blood-sugar content and die a few days later in a state of coma. In human diabetes this enzyme is not absent, but the amount available is not sufficient and the severity of the disease is dependent upon the percentage of insufficiency and is directly proportional to it. Insulin is the specific factor that supplies this deficiency and the amount and frequency of its administration must, therefore, depend upon the severity of the disease and the amount of foodstuffs, particularly carbohydrates, which are ingested. This deficiency is permanent, the weight and activity of the individual remaining the same, and for this reason its administration must be continued indefinitely.

Insulin does not take the place of dietetic treatment. This must remain much the same as before the advent of insulin. Many diabetics during the early stage of this disease are overweight. Many of these will, when given proper dietetic restrictions, loose their excess fat and become sugar-free. As they loose weight their basal metabolic requirement decreases and it may be possible for them to continue in good health and vigor with only a slight restriction of their food intake. Such patients should not be given insulin merely to satisfy their excessive appetites. No diabetic can be under proper treatment and remain obese. It is only to those who cannot retain a normal blood-sugar level on a diet sufficient to maintain a nearly normal body weight that insulin should be given.

In beginning treatment it is often desirable to first render the patient sugar-free by dietetic means and determine the individual tolerance. Preliminary starvation is always desirable for those who are overweight. When the urine has become sugar-free and the blood sugar has returned to normal the diet is gradually increased and each increase is balanced by a corresponding amount of insulin. When the disease is severe or when for financial reasons it is necessary to cut short the period of hospitalization specific therapy may be begun as soon as the diagnosis has been established and the blood sugar determined. This obviates the discomfort of a very low caloric diet. If the latter method is to be used the patient is put on a diet that is calculated to be sufficient to maintain the body weight at nearly the normal standard and supply enough energy for moderate activity. The proper initial dose depends largely upon the degree of hyperglycæmia. If this is not over .300 it is well to begin with one unit before the first meal, two units before the second and three before the third meal. From then on the amount should be increased from day to day until the blood sugar has reached the normal level. After the patient's metabolism has become adjusted to the desired diet it may be necessary to reduce the dosage and the interval of its administration. The total daily dosage varies from two to three up to forty or fifty units. The average case, however, does not require more than ten to twenty units. When this is the case it is often possible by shifting the bulk of the carbohydrate intake to the morning and evening meals to omit the noon dose. In milder cases it may even be possible to maintain the desired result with only one dose daily.

A patient whose urine is sugar-free may still be a very sick diabetic and exhibit many of the complications of the disease. A normal blood-sugar level is the only criterion of efficient treatment. This must be constantly bourne in mind and frequent blood-sugar estimations made, for otherwise the disease would be progressive despite the fact that the urine remained sugar-free. When blood is withdrawn, for test purposes, only before breakfast it should be remembered that at this time the blood sugar is higher than at any other time during the day and it is well not to reduce it lower than .130. This is particularly true when large doses of insulin are being administered.

Insulin is a very potent remedy and must be very cautiously used. When an overdose is given a hypoglycæmic state is induced. This is manifested by rather characteristic symptoms. With these the patient as well as the physician should be familiar. Joslin and the Toronto workers feel that each patient should be made to experience this condition while under hospital supervision so that they will thereafter be able to quickly recognize it should it again occur. Among the first of these symptoms to appear are sudden hunger, nervousness and tremor, marked weakness, flushing of the face and dilation of the pupils. Usually these symptoms appear when the sugar reaches .070 or .060; and should further depletion be allowed to take place the condition becomes more alarming and there is profuse sweating, anxiety, fear, emotional disturbances, confusion, delirium, convulsion, low body temperature, unconsciousness and death. Fortunately the premonitory symptoms are readily recognizable and are easily and quickly relieved. This can be done by giving some easily assimilable carbohydrate such as a lump of sugar, bread, milk or orange juice. Ten or fifteen minutes of 1-1000 adrenalin solution will usually give temporary relief. When the symptoms have progressed to a more alarming state half an ounce of syrup or glucose should be given orally, or, if necessary, by stomach tube and repeated in fifteen minutes if all symptoms have not disappeared. Should the patient be unconscious, fifteen minums of adrenalin solution will often bring about a temporary return of consciousness so that the antidote can be administered orally. If this cannot be accomplished 100 cubic centimeters of a 10 per cent solution of glucose should be given intravenously. The response is usually very prompt.

The patient with acidosis or coma requires special attention. Coma is not due to a greatly increased blood-sugar content per se but to the accumulation of ketone bodies. These ketone bodies, acetone, diacetic acid and oxybuturic acid, are formed by the incomplete combustion of fat. Fat can utilize only in proportion to the amount of carbohydrate consumed. In other words, the "fats burn in the flame of the carbohydrate," and when the carbohydrate flame burns low there is incomplete combustion of fat and the formation and accummulation of ketone bodies. This alters the reaction of the blood and lowers its carbon dioxide combining power and accounts for the hyperpnoea and the air-hunger type of breathing described by Kausmaul. Insulin theraphy is urgently indicated as it increases the carbohydrate metabolism, making it possible to burn these toxic bodies so that they may be excreted. The effect of insulin in these cases is often spectacular.

There are no accurate criteria for the dosage or frequency of its administration in these desperate cases. Most cases in actual coma require from 100 to 500 units. Early administration is of the utmost importance. The usual procedure of Allen and Sherrill is to introduce 25 units into the vein after blood has been withdrawn for test purposes. Twenty-five to fifty units are given subcutaneously and repeated at one- to three-hour intervals, depending on the laboratory and clinical indications. An ascending carbon dioxide combining power and decrease in the amount of acetone are of favorable omen, and the rapidity and extent to which these changes take place are indicators as to the further use of the drug. When such large amounts of insulin are given glucose should be given at the same time to guard against hypoglycæmia and reliance should not be placed in the amount of sugar present in the blood stream or the endogenous supply. Roughly, one gram of glucose should be given with each unit. Large amounts of liquid are to be given in the form of water and orange juice. No effort should be made to immediately reduce the blood sugar to a normal level as a somewhat increased sugar content not only acts as a buffer against hypoglycæmia but also favors diuresis and the elimination of toxic material. Experience teaches that it is well to keep the blood sugar at about .300 while combating coma. Sodium bicarbonate is of value in most cases but an overdose is to be avoided so that not more than 30-50 grams should be given during the twenty-four hours. When the ketone bodies have shown a material reduction and the clinical condition is improved the amount of insulin should be reduced, and the interval of administration gradually extended until all trace of acidosis has disappeared; and until this has been accomplished no food should be given except carbohydrates.

Insulin is a great boon to the diabetic patient needing surgical intervention. Formerly these patients were considered very poor risks and often went into a state of coma after any surgical procedure. With the use of insulin this risk has been reduced considerably. The urgent surgical case must be considered a potential case of coma and the blood sugar rapidly reduced to the normal level with large doses of insulin. Patients under diabetic treatment who require surgical intervention receive just before operation an additional dose of as many units as they have been accustomed to receive during their course of treatment. Immediately after operation or during it an estimation of the blood sugar and carbon dioxide combining power must be taken for their indication as to further treatment. It is well to remember that the diabetic with any sort of infection requires larger doses of insulin than would otherwise be the case, because fever and the absence of toxic material increases the metabolic requirement. After the subsidence of such an infection care should be taken lest a hypoglycæmic state be induced.

I do not intend here to go into detail regarding the calculation and arrangement of diabetic diets. It must always be bourne in mind, however, that 90 per cent of the fat and 46 per cent of the protein are capable of forming ketone bodies and that 100 per cent of the carbohydrate, 56 per cent of the protein and 10 per cent of fat when burned may act in an antiketogenic capacity. The following formula of Woodyat based on these values can be conveniently used:

Fatty acid: .46 P-.9 F.
Glucose: C-58 P-.1 F.

What the ideal ketogenic-antiketogenic proportion should be is still open to much discussion. The greater the proportion of the former the smaller will be the dose of insulin required. Where the cost of insulin is a factor and also in severe diseases more fat should be used than in milder cases of the disease. In the average run of patients the proper diet will fall between 1:1 and 2:1. Just as the treatment of diabetes was a failure before the application of more accurate knowledge of metabolism so also will be it a

failure with insulin unless this knowledge of metabolism is utilized in the dietetic management. In fact, a circumspectly arranged diet, and faithful adherence to it by the patient, is even more essential with insulin than without it because of the additional danger that hypoglycæmia can be so readily induced by insulin.

A preliminary period of hospitalization is an essential factor in the treatment. Not only can the blood sugar be more carefully controlled during the period of adjustment with insulin but the patient can receive systematic instruction as to how to take care of himself when under less strict supervision. Each patient should be instructed in the weighing and preparing of diets and the simple technique of Fehling or Benedict for examination of the urine. Where intercurrent or other circumstances make it possible to consume the full amount of ration the dose of insulin must be substantially reduced or discontinued to avoid a hypoglycæmic reaction. On the other hand, if the supply of insulin is temporarily interrupted the patient is instructed to reduce the diet by one-third. If sugar then appears in the urine a further reduction should be made. When the diet has been calculated and listed for then, most patients are able to carry out at home with a fair degree of accuracy a routine to which they have become accustomed while in the hospital. Blood-sugar estimations if at all possible should be done at intervals of two to six weeks.

The results of insulin theraphy so far fill a bright page in the annals of therapeusis. Many hopeless invalids have been improved to the extent of enjoying fair health and nutrition. Those less unfortunate can maintain health and vigor on a diet that offers only slight restrictions. Infections of all kinds which were so prevalent and caused such a high mortality among diabetics are now no more prevalent among well-controlled diabetics than among the non-diabetic population. Urgent surgical conditions can be relieved without the former dread of an operation. A disease which was progressive can be easily controlled and while under control there is much evidence to support the view that it looses its progressiveness. The return of weight and strength to those in a state of weakness and hopeless undernutrition is truly an inspiring spectacle.

411 Citizens Bank Building, Tampa, Fla.

BILATERAL JUVENILE CATARACT.*

SHALER A. RICHARDSON, M. D.,
Jacksonville, Fla.

Name: E. G. White male child, age 13.

Family History: Father, age 39, in good health. Mother, age 32, a patient in County Hospital at this time for a gynecological operation. Mother and father have good vision. Four brothers living, two of which have hookworm disease, and two in good health. Vision of all four brothers is good.

Chief Complaint: Blindness.

Present Illness: Mother states that the patient's vision has always been below par, but that up until about two years ago he was able to play as other children do. Went to school three terms and was in the third grade at the time that failure of vision prevented his further attendance. During the past year it has been necessary for him to be led about and now he only distinguishes light and dark.

Previous Medical History: Measles, whooping cough, malaria two years ago, smallpox one and one-half years ago.

Review of System: Head: Headaches often. Eye, Ear, Nose and Throat: Present eye trouble noted above; occasionally has earache. Cardio Respiratory: No cough or night sweats; feet and legs have been swollen few times; no shortness of breath. Gastrointestinal: Head diarrhea two or three summers with bloody stools; duration about one week. Genitourinary: Negative. Skin: Had eruption in spring of year for past three years; blebs characterized the eruption and it was more marked on feet and lower extremities; no scars. Habits: Appetite good; sleeps well; was never in hospital before.

Source of History from patient's mother.

Physical Examination: White male of 13; not very well nourished and considerably undersize; face has blank expression. Chest: Symmetrical; expansion full and equal; lungs clear; no dullness or rales; heart normal. Abdomen: Liver, kidneys and spleen not palpable; no masses, tenderness or rigidity. Genitourinary: Negative; no hernia. Extremities: Normal; reflexes sluggish. Glands: Cervical glands enlarged. Skin: Warm, moist and pliable; mucous membranes are pale.

Eye Examination: Vision: Right eye, light perception, projection excellent; left eye: light perception, projection excellent. Lids: Conjunc-

* Read before the staff of the Duval County Hospital, December 18, 1923.

tiva anemic; otherwise normal. Cilia: Normal. Lacrimal Apparatus: Normal. Cornea: Normal. Aqueous Chamber: Normal. Iris: Normal; pupils equal in size and reacted to stimuli normally; no synchia. Lens: The lenses were cataractous, giving the appearance of a hypermature, or Morgagnian cataract; the opaqueness was uniform. Fundus could not be seen.

Diagnosis: Juvenile Morgagnian cataract; needling advised.

Laboratory Examination: Urinalysis: Negative. Wassermann: Negative. Feces July 12, 1923, positive for hookworm.

Operative History: On July 14, 1923, after dilating the pupil and maximum with 1 per cent atropine, a needling of the right eye was done under local anesthesia. A Zeigler knife needle was used, it being introduced into the anterior chamber subconjunctively. A crucial incision of the anterior lens capsule was made. Immediately following this an opaque fluid containing flocculent masses poured out. Atropine and the usual dressing were applied.

At dressing the following day there was considerable lens substance in the aqueous channel. The pupil was well dilated. There was moderate reaction. No elevation of tension.

The lens matter rapidly absorbed. Reaction subsided promptly. On July 10, 23 and 26 all lens matter was absorbed, but the anterior capsule showed a slight thickness and it was deemed advisable to do a discission. A small opening was made in the anterior capsule under local anesthesia with a Zeigler knife.

On July 3, 8 and 23 a needling was done on the left eye, using the same technique and with similar results. The lens matter absorbed very quickly, leaving capsule through which the fundus could be seen clearly.

The post-operative treatment in each instance was: Atropine sulphate 1 per cent daily; hot fomentations one hour, three times daily.

Visual Result: December 1, 1923. Right Eye: With plus 14 sphere vision is 20/40. Left Eye: With plus sphere vision is 20/40.

Medical Treatment: On the following dates carbon tetrachloride hookworm treatment was administered: July 7, 19, 27. On July 28 the stools were negative for hookworm.

It is difficult to say that this is a congenital cataract, for we have nothing other than the indefinite statements of the mother to guide as to the child's visual acuity previous to two years ago. However, if the child progressed in school as stated, it is reasonable to assume that he had good vision. Then his cataract must be due to some condition that occurred after birth. Cataracts resulting from hookworm disease have been reported in the literature, and in this particular case it is certainly a possible etiological factor.

APPENDICITIS.*

E. H. McRae, M. D.,
Tampa, Fla.

It is an established fact of which we are proud to say, that appendicitis was proven as a disease entity, by an American, Reginald Fitz, of Boston, in 1886. I venture to say that there has been more discussions, more literature published one way or another since 1886 on this subject than any other subject pertaining to the body, and even with all that has been written and all that has been said since Fitz's time, we have, after the long span of thirty-seven years, yet to reach the acme of perfection in the handling of these cases.

Carr of London, in a recent paper, states that in spite of all advances of diagnosis and treatment, the death rate from appendicitis in England and Wales tends to increase rather than diminish, and now amounts to about 2,500 deaths a year or a little over 200 a month, and it is believed if figures were accurate and available, we should find that the death rate from appendicitis in the United States is not diminishing.

So far as we know today, appendicitis it not a preventable disease, but we do know this fact to be true, the possibility that if the patient is seen early and properly treated, the mortality rate will be kept at a low figure. The mortality rate for acute appendicitis ranges from 3 to 6 per cent, and in some cases higher. The end-results of operation for acute appendicitis is uniformly good, and while we find the end-results of operations for chronic appendicitis not so good, the percentage of unrelieved cases is alarmingly high. Thus, Deaver and Rodvin[1], in reporting the end results in 226 cases, report 9.7 per cent as only partially relieved and 7.07 per cent as unrelieved. Gibson[2], reporting 426 cases, reports 15.2 per cent as partially relieved, and 23.9 per cent as unrelieved. Such figures as these may well give us

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*Read before the Florida Midland Medical Society, at Bartow, Florida, October 22, 1923.

[1]Deaver, J. B., and Rodvin, I. S.: End Results of Five Hundred Cases of Chronic Appendicitis, Arch. Surg., 6:31-40 (Jan.) 1923.

[2]Gibson, C. L.: Results of Operations for Chronic Appendicitis, A. M. J. M. Sc., 159:654-663, 1920.

pause and force us to an intensive study of the factors that underlie such figures.

Lower and Jones[3] believe the high operative mortality in cases of acute appendicitis and the post-operative morbidity in cases of chronic appendicitis are due in a large measure to the common belief that in each case the only proper procedure is the removal of the appendix.

When the patient with acute appendicitis comes to operation, the removal of the appendix alone does not correct the damage already done by the attendant peritonitis, and there should be a more general appreciation on the part of both of the laity and of the profession that acute appendicitis with attendant paritonitis is not a localized but a systemic disease, to which the appropriate after-treatment as well as the appropriate operative procedures themselves must be applied. The morbidity after operations for chronic appendicitis in the majority of cases, is due to incorrect diagnosis—correct diagnosis in cases of supposedly chronic appendicitis and the proper handling of acute cases will lower the mortality rate of the latter condition and the morbidity rate of the former.

In contradistinction to these discouraging factors in the problem, it is pleasant to note a more encouraging condition. With the increased tendency of the public to consult a physician for chronic as well as for the acute disturbances, with their diminished reluctance to submit to surgical operation and, on the part of the surgeon, with increasing attention to the importance of the appendix as a focus of infection which may be responsible for many types of general functional disorders, the statistics of Lower and Jones show what appears to be a decreasing number of acute appendicitis cases and a corresponding increasing number of operations for chronic appendicitis.

Their earlier series of operations for appendicitis shows that 60 per cent were for acute and 40 per cent for chronic appendicitis. Their series for the last two years shows that only 28 per cent of the total number were for acute appendicitis while 72 per cent were for chronic appendicitis.

Cooke[4] of Los Angeles recently made some very pertinent remarks regarding the problem of diagnosis in surgical lesions of the right iliac region. He says, in some sense, most intra-abdominal operations are exploratory. After every diagnostic recourse has been exhausted, it happens with disconcerting frequency that conditions are encountered at operations of a different and far more serious character than was anticipated. This is especially true in lesions of the right iliac fossa, in which the appendix so completely dominates the diagnostic picture.

Enumeration of the extra-abdominal conditions alone which have been mistaken for appendicitis and treated by operation would make an interesting list, embracing such diverse maladies as pneumonia, tabes, sciatica and spinal caries; and practically every intra-abdominal lesion has furnished the occasion for similar misdirected enthusiasm. He further states that a series of recent cases in which the diagnosis of appendicitis proved to be incorrect or in some respect misleading has served to direct his attention very forcibly to this question. When first seen, each one of these cases presented every appearance of a typical acute attack, and delay for prolonged study seemed both unwise and unwarranted. In the light of the operative findings, it is quite evident that accurate differential diagnosis would not have been possible even had time for investigation been unlimited.

Case 1.—Operation disclosed a normal appendix, about 6 inches from the ileocecal valve, the ileum presented small undurated mass with many dense adhesions about it. The intestine was twisted upon itself so that almost complete obstruction had resulted. The indications were clear for resection.

This was done and end to end anastomosis with sutures effected. The condition proved inflammatory.

Case 2.—The trouble was found at base of appendix and involving the cecum as well, a large area of the latter being densely infiltrated and presenting numerous foci of suppuration and necrosis. Operation consisted of resection of approximately two-thirds of the diseased cecum.

Case 3.—Presented typical symptoms of acute appendicitis. An oblique muscle splitting incision was made, no appendix or cecum found or any pathologic changes in this vicinity. A second incision was made through rectus muscle on a higher level and the cecum and appendix found. Appendix lay in contact with gall-bladder, with newly formed adhesions extending in all directions.

Case 4.—A physician, with a diagnosis of acute appendicitis. Operation revealed a large tumor of the cecum which proved to be a diverticulum of the cecum containing a firm, round fecal-

[3]Lower, William E., and James, Thomas E.: Surgery of the Appendix. Jour. A. M. A., Vol. 81, No. 8, 629-631.

[4]Cooke, A. B.: The Problem of Diagnosis in Surgical Lesions of the Rt. Iliac Region. Jour. A. M. A., Vol. 81, No. 8-627-629.

ith approximately ¾ inches in diameter. A total excision of the cecum was done; an end to end anastomosis of the ileum to the ascending colon being made with sutures.

I have had two cases recently where the appendix was found in close proximity to the liver.

These cases will suffice to indicate the diagnostic uncertainties and operative difficulties that may be associated with the surgery of appendicitis. As matters stand at present, the general practitioner, so far as relates to appendicitis, practically no longer exists. It has come to be the rule in most communities that the family physician who usually first sees these cases is himself both willing and eager to operate. Asked whether he does surgery he is apt to reply, "No, except in simple cases like appendicitis." And may I ask what will be the results in some of the unfortunate cases handled by the man who acknowledges he does not do surgery except in simple cases like appendicitis? This is one of the contributory causes for failure and increased percentage in mortality. Then, if you please, the procrastinating doctor who first sees the case, and the patient who prevails upon him to wait until the following day. Also, we yet in this supposedly enlightened time see cases that have had calomel, oil and salts administered and morphine injected to ease the belly pain. This is condemned as being really criminal. Let us remember this one point, that there is a grave elemental danger in acute abdominal pain and that home treatment must be limited to (1) bed rest, (2) no water, food or medicine by mouth, (3) no laxative other than a small, low enema, (4) no sedative, not even the ice bag, and (5) the physician. Physic and food have caused more deaths in this disease than delay or indifferent surgery. The appropriate treatment of severe acute cases, which includes faithful application of the Ochsner treatment before operation, after the operation Fowler's position, plus Ochsner treatment, plus the Alonzo Clarke treatment for peritonitis, plus large hot packs over the abdomen, plus hypodermoclysis, plus intravenous glucose solution. The full treatment must be rigidly applied to get the best results.

In all acute appendicitis cases where there is drainage and the appendix is not readily accessible, the removal of the appendix and such other exploration as may be advisable being deferred until the acute state is past. In other words, get in and get out—with drainage tubes properly placed.

The late great Master Surgeon John B. Murphy said in diagnosing the gangrenous appendix we must always bear in mind that pain, nausea and vomiting, fever, and leukocytosis, are all reactions to infection, not infections themselves. They are not disease, they are the manifestations of disease in the lining. The appendix which is dead, like the patient who is dead, presents no symptoms.

The mortality rate in appendicitis in children is three or four times as high as in adults. No doctor lets his own child go unoperated through an attack of acute appendicitis. Why should he treat his patients any differently?

The most important acute lesions or affections of the abdomen to be differentiated from appendicitis, are the acute inflammations of the gall-bladder, stomach and duodenal ulcers; typhoid fever; stones in the right kidney or ureter; pneumonia, especially in the lower lobe of right lung, with or without pleurisy; pain from lead poisoning producing acute griping in the abdomen; and in the female acute pelvic inflammations, or ruptured ectopic pregnancies.

Gall-bladder affections, either acute or chronic, the pain is most invariably located directly over the gall-bladder, at the junction of the 9th costal cartilage with the sternum; pain referred to back under right scapula, intermittent and more griping. Often a tumor or distended gall-bladder may be palpated or percussed associated with history or previous attacks of jaundice.

Stomach and duodenal ulcers, there is nearly always a history of long-standing digestive disorders, this pain is likewise higher in the abdomen. As a rule, is affected by intake of food.

Few cases of typhoid fever should be confounded with appendicitis. The onset of common typhoid is seldom sudden. The temperature is usually typical and there is nearly always a history of prodromal symptoms of several days. The pain on palpation is not intense, and there is seldom any muscular rigidity.

Stone in the kidney, or ureter, is usually easily differentiated. The pain almost invariably originates at the site of the kidney, radiating down the course of the ureter, into the bladder and often into the external generative organs down the inner side of the thigh. It is more griping and often ends suddenly by a stone passing into the bladder. The character is usually different; in stone is often intermittent—microscopic examination of urine is valuable. The x-ray is nearly always positive as to absence or presence of stone.

A differentiation of pelvic disorders from appendicitis is often most difficult. But with a history of a veneral infection, and pelvic examination, we should be certain of a diagnosis. The proximity of the menstrual period is most important, especially in young girls, ectopic pregnancy, ruptured or not; nearly always there is a history of irregular menstruation. The pain is extremely sharp and lancinating, with, as a rule, profound shock and palor and evidences of internal hemorrhage. In doubtful cases pelvic examination should always be made.

The most difficult condition to differentiate is pneumonia of the lower lobe of the right lung, or indeed in any portion of the right lung, with or without pleurisy. A careful history, thorough examination of chest, the presence or absence of a cough, should be noted, rapid and painful respiration, high temperature and pulse, aid much. There is seldom the nausea and vomiting of appendicitis with pneumonia.

It has been my rule for years to remove the appendix in all cases where the abdomen was opened for other causes, unless it was that the condition of the patient would not allow the extra time consumed.

CONCLUSIONS.

1. That the present mortality rate in acute appendicitis is still too high.

2. That the incidents of error in operations for chronic appendicitis is still too great.

3. More stress should be laid on the treatment of the attendant peritonitis in acute cases and less on the mere removal of the appendix.

4. More care and detail work in the diagnosis of all chronic appendicitis cases is most essential.

ANAPHYLAXIS AND THE SURGEON.*

GEO. E. W. HARDY, M. D.,
Tampa, Fla.

The term "anaphylaxis" means "against protection" and was introduced by Robert Richet, the French physiologist, in 1902, to designate a peculiar power possessed by certain poisons of increasing the sensitiveness of an organism to their toxic action. As early as 1791, however, Jenner in his classic work on vaccination, described certain phenomena which we now know were definite anaphylactic reactions. Moreover, Magendie in 1839 observed that dogs which had been injected with a foreign serum developed a peculiar form of illness which often resulted fatally if they were reinjected within a period of ten or twelve days.

Richet experimented on dogs, injecting into them an extract obtained from the tentacles of the sea anemone. Soon afterwards von Pirquet and Schick reported similar reactions in patients suffering from scarlet fever who had had repeated injections of antistreptococcic serum. They found that an animal injected with a foreign serum reacted to a second injection in a manner very different from the first, and they showed that in order to obtain this changed reaction eight to thirteen days must have elapsed between the first and second injections. Seeing the correspondence between this period and the incubation period of many of the infectious diseases, they brought the phenomenon linked to immunity and gave it the name "allergy." Until we know more about the nature of the process, however, it is preferable to employ Richet's original term meaning a condition of hypersensitiveness.

During more recent years various investigators have shown that animals can be sensitized, that is, rendered hypersensitive, not only to horse serum but to a great variety of other foreign proteins, such as egg albumin, hemoglobin, milk, oatmeal, extract of peas, and bacterial proteids, including those of the colon, anthrax, tubercle, yeast, and typhoid bacilli. Even the laity recognize that some people cannot eat certain articles of food without breaking out in hives. Probably the most numerous of such cases are those who cannot eat strawberries, without developing urticaria and pruritus.

The explanation of this condition is that when a foreign protein is introduced into the blood of an individual, antibodies for that particular protein which are either present at the time or are soon formed, begin the destruction of such foreign protein. This is accomplished by decomposition or splitting up into simpler forms of matter. When the decomposition reaches a certain point, poisonous products are formed, but these are further decomposed into non-poisonous products. Should a large amount of the poisonous products be liberated at one time they might do great damage to the individual before they could be further decomposed and rendered inert. Practically the same process occurs in gastric and intestinal digestion, but the

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poisonous products are easily decomposed and rendered inert before they are absorbed into the system. Should digestion stop at this point, the poisons might be absorbed and cause a condition of auto-intoxication which may be looked upon as analogous to anaphylaxis. It is probable that upon the introduction of the foreign protein of horse serum, in anti-toxin for instance, there are but few anti-bodies for that particular substance present. Its destruction or breaking up takes place slowly and small amounts of the poisonous products of decomposition are liberated at a time and they are soon neutralized without doing any injury. During this process, large amounts of antibodies are formed. If now, at the height of production of these antibodies, usually in about eight to ten days from the first injection, another injection of the same serum be given, it is decomposed so rapidly that a large amount of the toxic element is produced at once, and the injurious effects of anaphylaxis are manifest.

The true anaphylactic reaction developed within twenty minutes after the introduction of the foreign protein and consists of a more or less severe asthmatic attack with dyspnea and flushing of the face, followed by cyanosis, sweating, cough, general anxiety, and an urticarial eruption. Occasionally in from twenty minutes to one hour after the injection of a foreign protein, there may occur chilly sensations or a general chill, slight difficulty in breathing, and cyanosis. The temperature rises rapidly 1-3° and then falls, often to normal. During this fall there may be profuse sweating. Such reactions are known as thermal reactions and have not been classified as anaphylactic in nature because they often occur after the first injection of a foreign protein. A third type of reaction and one that is anaphylactic in nature, is the so-called serum sickness or disease. This usually appears within seven to fourteen days after the injection of the serum and is manifested by fever, skin rashes, most frequently urticaria or erythema of the skin, general glandular enlargement, and pains in the joints. These symptoms may appear singly or in combination. The attacks may recur one or more times at intervals of a few days to a week or even longer.

At the time that Richet coined the term "anaphylaxis" the research work consisted mainly of laboratory work upon animals, but it was not long before William Dunbar, an American physician in Hamburg, Germany, investigated the disease of hay-fever and found that it was due to pollen circulating in the air. He set to work to produce vaccines to combat the fever and gave to the profession pollatin. His work stimulated other investigators and during the past eight years much and valuable work has been done, not only on hay-fever but the related diseases of bronchial asthma, angio-neurotic edema, and the various food intoxications. Webb and Goodale, of Boston, have been very successful in treating many cases of hay-fever with the vaccine, while Austrian in Baltimore reported his investigation upon angio-neurotic edema as a symptom of hypersensitiveness to certain articles of food.

The term "angio-neurotic" means a vasomotor neurosis and it is interesting because for a long time the emphasis placed upon the neurosis obscured the real etiology of the lesion. It has long been recognized that there is a neurotic element in patients suffering from bronchial asthma and hay-fever and, in fact, in all cases where there is hypersensitiveness to a foreign protein, there seems to be a neurotic tendency and a somewhat unstable circulatory system. However, the belief that these patients were simply neurotics has often blurred the vision of the diagnostician and subjected the patient to months and even years of suffering when if the condition had been correctly analyzed and the etiological agent sought, it would have relieved the patient mentally and physically.

Three methods have been employed for the determination of hypersensitiveness in an individual. The first, and apparently the simplest, yet often the most tedious, is the elimination test, removing foreign proteins one by one and finally reaching the guilty one by a process of elimination. The second, or cutaneous test, is more satisfactory and is easily performed. The skin is abraided without drawing blood and an aqueous 5% solution of the suspected substance is rubbed in as in ordinary vaccination, controlling it by means of normal salt solution. If hypersensitiveness exists an urticarial wheal with a pink areola should appear in about ten minutes and persist 30 to 40 minutes. The third, or intracutaneous test, is still more sensitive but somewhat painful. A small drop of 2% solution of the substance is injected into the skin with a very fine needle, the syringe being laid almost flat on the arm. The same urticarial wheal with an erythematous

areola, with perhaps a small papule, should develop within 30 minutes, provided the reaction is positive. The maximum reaction may be delayed for several hours and not infrequently an infiltrated nodule persists 24 hours or longer.

With these remarks we will dismiss the general subject of anaphylaxis and turn our attention to the more narrow field of the relation of the surgeon to anaphylaxis from the standpoint of his patients and from the standpoint of himself. I wish to report tonight several cases of hypersensitiveness that have occurred in your midst during the past year and with which some of you are already acquainted. Finally, I want to give a demonstration of a delayed anaphylactic test.

From the standpoint of the patient the subject may be divided into therapeutic anaphylaxis and diagnostic anaphylaxis. Therapeutic anaphylaxis must be considered whenever we administer a dose of tetanus antitoxin. How many of us before giving the customary 1500 units inquire into the past history of the patient regarding hay-fever, bronchial asthma or the previous injection of horse serum for one cause or another? Or, how many of us before injecting the entire amount of the serum, inject one or two drops into the skin and wait five or ten minutes to see if there is a reaction? But suppose the doctor is thoughtful and does think of the danger and makes the simple but effective test and finds the patient is sensitive to horse serum and yet feels that the patient should have the antitoxin, what should he do? He can densitize the patient by the repeated injection of very small amounts of serum, subcutaneously at first, then intravenously. The details need not be mentioned here. The same precautions must be used in administering horse serum to control postoperative hemorrhage or as a prophylactic against hemorrhage in the icteric. Some of us have seen severe attacks of serum disease following the injection of serum for this purpose. In the administration of sera for the treatment of streptococcic, staphylococcic, and gonococcic infections anaphylaxis must likewise be considered and guarded against. Finally in the rare case of gas gangrene, whether the serum used is the monovalent serum of Bull and Pritchett or the polyvalent serum of the Pasteur Institute, anaphylaxis again must be reckoned with.

Turning now to the side of diagnosis, how does the surgeon make use of anaphylaxis? First, in the detection of tuberculosis. There are four standard tests, the Calmette or ophthalmic test, the intracutaneous test of Mantoux, the von Pirquet or cutaneous test, and the subcutaneous test. Since from the surgical standpoint the test is most often employed in the diagnosis of bone, joint, and gland tuberculosis, the subcutaneous test is the preference as it is most likely to be of value on account of the focal reaction of hyperemia, swelling, heat, and pain. Second, the luetin reaction in the diagnosis of syphilis. This test is not as well known as the Wassermann test and is not as reliable as the Wassermann test, but is often helpful in the diagnosis of late-acquired syphilis and congital syphilis. In the diagnosis of the rare diseases sporotrichosis, blastomycosis, and glanders, the intracutaneous tests have been helpful.

Let us now consider anaphylaxis as applied to the surgeon himself. The health of the surgeon is of little importance in the majority of communities during the time of peace, but it is a matter of vast concern in the time of war. During the period of modern aseptic surgery it has been frequently observed that the hands of some surgeons can not tolerate the solutions often used in the disinfection of the hands, such as potassium permanganate and oxalic acid, Harrington's solution, and dichloride of mercury. Usually this has revealed itself in a dermatitis of varying degree and not by an anaphylactic reaction. However, the dermatitis has been sufficient to incapacitate a man for a longer or shorter period of time and this occurrence of the dermatitis has led to a more simple preparation for the hands until today in many hospitals the technique consists of the usual scrub with green soap and water followed by a rinse in sterile water and then a soak in alcohol. Since the universal adoption of the use of novocaine during the past few years a few cases of true anaphylactic reaction to novocaine have been observed and reported as occurring among the dental and medical professions. A few such cases have been reported in the literature during the past eighteen months. Tonight I wish to report one case of hyposensitiveness to novocaine and one case of hyposensitiveness to dichloramin-T. I have failed to find a single case of the latter reported in the literature. The history of the two cases will show how rare hypersensitiveness to these substances has been and through what suffering, both mental and physical, a patient will often have to pass

before a correct diagnosis is finally made and the ailment easily relieved. The case of hypersensitiveness to novocaine will be reported first because it not only occurred first, but its diagnosis was the key to the diagnosis of the second case.

Dr. R. J. has been practicing eye, ear, nose and throat surgery in this city for nineteen years and has used a large amount of novocaine during the past five years. About four years ago, he noticed a few small vesicles on the dorsum of his right hand. These would appear at odd times, remain a few days and then disappear and another crop would appear after several weeks. These vesicles itched intensely and when they were scratched serum would come from them. As they grew worse and became more frequent, he tried to discover their cause and as he is a great sportsman and likes the outdoors, he thought that he perhaps had some form of poison ivy or poison oak. Therefore, he stopped hunting, but the vesicles continued to form and began to spread. They no longer confined themselves to the dorsum of the right hand, but huge bullæ appeared on the palms of both hands, but principally on the right. Then he thought tobacco might be the cause as he was an inveterate user of the fragrant weed, so he ceased using tobacco. But still the vesicles and bullæ continued to form, his hands would swell and itch, and when the vesicles and bullæ were ruptured they often became infected and huge, raw places and abscesses would form. The hands would get better with a rest and then after a few days of work they would go bad again, and thus it was a continuous performance of work and rest, but the patient was meanwhile laboring under a severe mental strain and had periods of pronounced depression. When a vesicle was ruptured, if the serum from it touched an area of normal skin it seemed to act as an irritant and produced vesicles. During this time the patient wore cotton gloves beneath his rubber gloves to relieve the pain produced by the slightest pressure on his fingers or hands. Even the pressure of instruments was sufficient to produce intense pain. Seeking to discover the cause of this insidious disease, the patient started a process of elimination. He stopped petting his dog, but that did not help. Then the parrot, again with no results; and in turn he tested meats, eggs, salt, milk, and his favorite pastime, fishing. All to no avail. Many remedies were tried, from sulphur-soap to iodine, only temporary relief was obtained. Finally, in desperation he left Tampa, in February, 1922, and went to Baltimore and consulted some of the best dermatologists in that city. Cultures were made from the serum contained in the vesicles and they were negative for growth. A diagnosis of dysidrosis or pompholyx was made from the following facts, that the majority of the vesicle and bullæ were situated in the palm of the hand, that they apparently developed in the coil glands of the skin, that they occurred in crops, that they tended to coalesce, their freedom from spontaneous rupture, and the frequent occurrence of secondary pyogenic infection. X-Ray treatment was advised but refused. On leaving Baltimore the patient was apparently well, so he returned to Tampa and began work once more. He had noticed before that whenever he stopped work the lesion seemed to disappear, whether he left this city or not. The vesicles appeared again soon after he returned from Baltimore and he decided to take a long vacation. In April, 1922, he went to Hot Springs, Arkansas, where he took the baths and was free of the eruption after two weeks. Then he took an extended trip West and visited his brother in Colorado and returned to Tampa in August, 1922. The second day after his return he did a tonsillectomy under local anasthesia of 2 per cent novocaine in his office. He had always used gloves in these operations, but when he got his gloves out for this operation he found that they had rotted during his absence so he performed the operation with bare hands. In injecting the novocaine, some of it leaked from around the needle and ran down the inner posterior side of the index finger of the right hand, continued across the dorsum of the hand and stopped on the palm surface of the wrist. Another drop ran to the ulnar side of the hand and stopped at the hypothenar eminence. The patient thought nothing of this, but one hour later noticed that the hand felt stiff and the next morning when he arose there was a line of vesicles down the index finger and across the dorsum of the hand, and the palmar surface of the wrist was a solid mass of inflammation. The diagnosis was made right then, the patient was forced to stop work for two weeks to recover from the inflammation, but his mind was set at rest and he regained his enthusiasm and interest in his work, which he had entirely lost during those three years. He continues to use novocaine, but always protects his hands with rubber gloves and never uses a pair of gloves twice, because he has found

that even the smallest trace of novocaine left on the gloves after thorough washing is sufficient to produce the vesicles. Several months ago while doing a tonsillectomy, some novocaine squirted on his forehead and the typical vesicles appeared after twelve hours. He has found that it usually takes eleven hours for the reaction to appear after a drop has touched his skin, and about two weeks for the crop of vesicles to disappear. This is done by process of exfoliation of the underlying stratum corneum. The rupture of the vesicles leaves a raw area and, therefore, it is best to leave the vesicles intact.

The history of the second case resembles that of the first in many respects. It differs from it in the duration and the distribution. The second case ran from April, 1922, until April, 1923, and the vesicles came first on the upper lip and they were so small at first that they escaped detection. The lip was about three times its normal size and clear serum came from it, causing the patient to think he had a case of weeping eczema. The lesion then spread to the lower lip and by the end of a week a few vesicles appeared on the fourth finger of the right hand. The condition of the lips was probably aggravated by repeated shaving. The patient took purgatives and sweat-baths but still the condition grew worse, so at the end of a week he went to Baltimore to consult a determatologist. By that time the right ear was slightly involved. The raw area on the lips had become infected and a diagnosis was made of suppurative sycosis. Cultures showed a growth of staphylococcus aureus. The dermatologist said, however, that he thought the lesion might be anaphylactic in nature due to some article of diet and advised the patient to remain in Baltimore long enough to be tested out against different foods. The patient felt that he must get back to work, and since, after one week of rest in bed and the application of Burow's solution, the lesion had cleared up, he returned to his work in West Virginia. After two weeks of hard operative work the lesion again appeared and this time spread over both lips and cheeks, both hands and both ears. The ears were swollen to three times their normal size and pus ran from them. Various remedies were tried, but nothing gave relief except the Burow's solution. After six weeks' of this he again returned to Baltimore and consulted one of the leading dermatologists in that city. He was told that the lesion was simply a weeping eczema and was given the stock ointment for such, containing oil of cade. At the patient's request, two very light X-Ray treatments were administered. The condition grew better and again after a week the patient returned to West Virginia and began work. The vesicles appeared at the end of a week and this time the palmar surfaces of the wrists were chiefly involved. The patient then limited his work to the operative side and had his assistant do the dressings. Moreover, he went to Roanoke, Va., every three weeks for X-Ray treatment. Under this regime the lesion began to disappear and by the first of August the skin was practically clear. Meanwhile he had experimented with the water-supply to some extent; and, after an intracutaneous test with the drinking water had given a mildly positive reaction, he had decided that the water in that region was responsible for the trouble. Accordingly, all water used for drinking purposes was boiled. There was no doubt about the water in that section being bad, because it was often so contaminated that the air was actually foul. For cleansing purposes, olive oil was used to a large extent. On the first Sunday of August the patient planned to make a trip across the mountain to take a swim and therefore did the dressings, so that his assistant could have the morning free. That afternoon he took a long swim and it was the first time that his face had touched water for three months. The following morning his face was swollen badly and covered again with vesicles. The natural conclusion was that the water was the etiological agent and it was tabood. The patient left West Virginia in the early part of September and took a month's vacation in Maryland before coming to Florida. The skin eruption disappeared within a week after leaving West Virginia and the patient felt confident that the water of West Virginia had been the cause. Three days after arriving in Tampa, in October, after being up very late one night and overloading the stomach, a few vesicles appeared on the right hand and there was some itching, but the vesicles soon disappeared without any treatment. On the 19th of November, while at a private house for dinner, the patient drank a rather large amount of whiskey. Three hours later he felt his hands getting hot and itching and they felt as though they were many times the normal size. The following morning they were covered with vesicles, and a few vesicles appeared on the upper lip. He consulted Dr. Dickson about the advisability of X-Ray treatment

and Dr. Dickson very kindly gave a course of six treatments at that time and repeated the same the beginning of this year. After the attack in November the patient had no further trouble until the 15th day of March. Suddenly without any warning there appeared the characteristic vesicles on the fingers of the left hand and on the upper lip. The next day they continued to spread and on the 17th day they were on the lower lip and had also involved the palmar surface of the left wrist. The patient was desperate and the mental depression was marked. Finally he talked over the situation with patient No. 1 and was advised to remain here and try to find the cause from the history and by skin tests. In reviewing the recent history it was seen that he had used three substances that week that he had not used previously since coming to Tampa. They were green soap, guava wine and dichloramin-T. It seemed foolish to suspect the first and last because they had been used extensively by the patient while he was in the Union Memorial Hospital in Baltimore and the Rockefeller Institute in New York, but nevertheless it was decided to test them and Dr. Blake was asked to give the cutaneous test. One test and its control was done each day on three successive days. The first two gave no reaction. The third was done at noon one day and at 8 o'clock that night there was no reaction apparent. The patient then took a long drive and on returning home at 11 p. m., noticed that his right forearm where the test had been given itched a great deal. On removing his shirt he found a vesicle the size of a silver quarter. The following morning the vesicle had ruptured, leaving a raw area which grew to the size of a silver dollar. That day another cutaneous test was done on the left forearm and it likewise was positive after 11 hours. It took two weeks for the wounds to heal and at least six weeks for the discolorations to disappear. The use of dichloramin-T was discontinued and the patient has had no further trouble with his skin. After the diagnosis was made it was easy to follow the history of the disease and to explain each detail. The patient had used dichloramin-T extensively in the Army, he used it very little while in hospital work in Baltimore after the war. When he went to West Virginia he found the dressings being neglected. There was the need of an antiseptic that could be used once daily with good results, so he installed the dichloramin-T and did all the dressings at first so as to show his assistant how to use it. The skin eruption appeared one week after the installation of the dichloramin-T. Its first appearance on the upper lip was explained by the fact that the patient has always liked the smell of that antiseptic and whenever he got a bit of it on his fingers he would rub his nose to get the smell. The freedom from the eruption in July, 1922, is explained by his not doing dressings, and the recurrence after the swim the first Sunday in August was caused not by the water but by the dichloramin-T used in the dressings that morning. As for the two minor attacks just after coming to Tampa they seemed to depend upon a dietary indiscretion and a circulatory disturbance. The history of the last attack is like that of a text-book. The dressing with the dichloramin-T was done with the left hand and the patient distinctly remembers rubbing his nose with that hand and scratching the back of his neck, the spots where the vesicles appeared.

In both cases reported the lesions consisted of vesicles varying in size from a pin-point to a pin-head. Usually the appearance of the vesicles was preceded by a sensation of heat, swelling, tingling and itching in the location affected. The area also became very red. After a few hours of these signals the small vesicles would appear. They would gradually become larger, remaining discrete for four or five days and not increasing beyond the size of a pin-head. Later they would coalesce. If left alone and not injured they did not tend to rupture and the healing was accomplished by a process of exfoliation. Whenever the vesicles were ruptured raw surfaces formed and pus appeared unless sterile dressings were applied. When in a location such as the palmar surface of the wrist and exposed to frequent friction from the sleeve, the vesicles quickly coalesced and formed large bullæ and the surrounding tissue gave the appearance of a cellulitis. In the first case, abscesses did not form and the patient bears a few scars now as the result. The location of the vesicles in the two cases was somewhat different. In the first case they were chiefly in the palms of the hands, leading to the diagnosis of pomphylox. In the second case the face was mainly attacked and the palms of the hands were relatively free of the lesion. In both cases the reaction came eleven hours following exposure and it took two weeks always for a crop of vesicles to heal. Burows' solution was beneficial in both cases. X-ray treatment helped the

second case but did not prevent the recurrence of the lesions. In both cases the merest trace of the respective poison produced the lesion.

In both cases we are dealing with an organic compound from the chemical standpoint. Both substances are carbon compounds and belong to the benzene series. Both are neutral in reaction. One is soluble in water, the other is not. In the first case we must regard the substance as a stable compound. In the second case, the substance itself or one of its derivatives may be responsible for the reaction. Dichloramin-T is neutral in reaction and non-irritating to the skin and has only slight solvent action. When exposed to the action of light and moisture, it readily decomposes liberating chlorine and hydrochloric acid is formed. Since dichloramin-T is insoluble in water, an oil must be used for the vehicle and as most oils are attacked by the tremendously active chlorine, it is necessary to use as a solvent an oil which has been previously saturated with chlorine. Chlorcosane is used for this purpose. It is hard paraffin that has been saturated with chlorine gas. This saturation lowers its melting point and it remains a liquid. It is not an antiseptic in itself. In the second case, therefore, we do not know whether the patient is sensitive to the dichloramin-T or to one of its derivatives. The natural assumption would be that the powerful chlorine gas was producing the reaction. However, the patient has been in contact with Dakin solution since the diagnosis was made and there has been no reaction in spite of the fact that Dakin solution when applied to the normal skin for any length of time is highly irritating. Dichloramin-T on the other hand is non-irritating to the normal skin and for that reason alone is much easier to handle.

Both cases present a dermititis and since the dermatitis is due to a poisonous substance and not to a mechanical injury we must necessarily classify them under dermatitis venenata which covers a broad field and allows much speculation regarding the etiology. However, in reading the text-books and the current literature one is impressed by the fact that the dermatologists are coming more and more to the belief that anaphylaxis is back of all these reactions to foreign substances. To illustrate the close association of dermatitis venenata to bronchial asthma, compare the person who develops a dermatitis after simply passing near Rhus toxicodendron with the person who goes into a fit of bronchial spasm after smelling a horse. In other words, in these cases we must consider the dermatitis merely as a symptom just as we now do angio-neurotic edema, and recognize that behind all of these diseases, whether it is the bronchial musculature, the nasal mucous membrane or the skin that is primarily attacked, that we are dealing with the same fundamental condition of anaphylaxis or hypersensitiveness to a foreign substance.

TREATMENT OF INTESTINAL OBSTRUCTION.*

E. H. Teeter, M. D., F. A. C. S.,
Jacksonville, Fla.

It is conceded that the surgical treatment of intestinal obstruction is one of the greatest and most disastrous operations which confronts the surgeon. Prompt and accurate diagnosis and early surgical intervention are of the utmost importance.

A surgeon's emotions are sure to be mingled with pride and chagrin. In one instance, a brilliant operation has saved a patient's life. In another, procrastination and hesitancy has thrown away a last chance, and death takes the winning trick.

Acute intestinal obstruction may be mechanical or paralytic. In most cases obstruction is due to external strangulated hernias, volvulus, intussusception or post-operative and post-inflammatory bands.

Symptoms are usually rather definite, variations occur, due to the location and the nature of the obstruction to the stage of the obstruction and to the completeness or incompleteness thereof. The condition usually runs its course in three stages.

First stage: There is a sudden, severe pain; nausea appears promptly; vomiting is usually persistent; pulse, temperature and respiration about normal. There may be slight bowel movement. If these symptoms remain unchanged after gastric lavage and one or more high enemas are given, then surgical treatment would seem inevitable.

In the second stage the pain continues, varying in degree between paroxsyms of agony and intervals of relative ease. The vomiting, which is persistent, indicates somewhat by the quantity

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*Read before the fiftieth annual meeting of the Florida Medical Association held at Jacksonville, May 15, 16, 1923.

emitted, the location of the obstruction. The character of the vomitus changes with the progress of the affection. The abdomen is distended, the legs drawn up, the pulse rate increased, the temperature slightly elevated. There is rather characteristic anxiety facies. The white blood count usually is normal, providing there is no inflammatory condition at the site of the obstruction.

The third stage is accompanied by signs of collapse and shock. The pulse is thready and there is usually regurgitation of black fecal smelling vomitus through the mouth and nose. Surgical intervention becomes imperative. Palliative treatment is indicated only in cases in which the general physical condition is such that the operative danger is prohibitive. At operation when the obstruction is located there are conditions which confront the operator; first, the relief of the obstruction; second, the repair of the bowel; third, whether or not to drain the bowel at the site of the obstruction.

The removal of the intestine at the point of the obstruction is at times essential, but often more complicated conditions are presented by the bowel changes caused by the obstruction. Here your operative judgment must prevail in the treatment instituted.

If the obstruction has continued for sometime and the elasticity and contractility of the bowel are markedly involved the bowel should be drained above the point of the obstruction. The drainage of the upper bowel has been shown by clinical experience to be of great value. First, because the toxic material in the bowel is removed. Second, the distension of the bowel which has impeded the circulation is relieved.

After the diagnosis has been made and if operative procedures are advisable, morphine should be given hypodermically to quiet peristalsis; the stomach emptied by lavage, and the rectum evacuated by an enema unless such already has been done. Purgatives are contraindicated. In the absence of a definite diagnosis, the abdomen should be opened in the median line below the umbillicus. If the cecum is distended explore the sigmoid flexure; if the sigmoid is collapsed the obstruction is in the large bowel between the sigmoid and the cecum. If the cecum is collapsed it will be necessary to follow the small bowel until the obstruction is found. Another rule is to select the most dilated and congested coil of the bowel and follow it in the direction of the increasing congestion and distention. In the most urgent cases no attempt should be made to find the seat of the obstruction but the abdomen should be opened under local anesthesia, and an artificial anus established in the presented, distended coil of the intestine.

Before or after dealing with the obstruction, particularly in late cases in which peristalsis is feeble or absent, the great distention should be relieved by incising one or more coils of the distention and allowing the contents to escape. The obstruction is dealt with according to its cause.

Chronic obstruction is generally due to limited adhesions, the treatment of which is the separation of the adhesions of the involved coils of the bowel, and if possible covering the raw surfaces with peritoneum.

In volvulus, it is necessary to untwist the loop of the intestine. In some cases it may be necessary to evacuate the distended bowel by puncture before this may be accomplished. If the gut is viable the puncture is closed with a purse string suture and the bowel replaced. By fixation of the bowel to the abdominal wall, a recurrence of the volvulus may be prevented. If the bowel is gangrenous it must be resected. If the patient's condition forbids this it should be brought out of the abdominal wound and an artificial anus established. Chronic volvulus should be resected.

Extra intestinal tumors such as cysts and abscesses may compress the bowel, as may also viscera other than the intestine, e. g., pregnant or retreverted uterus, floating kidney or enlarged spleen.

Treatment of a fibrous stricture of the bowel is resection and anastomosis. Spasmodic stricture of the bowel may be caused by lead poisoning or irritating intestinal contents, and trauma. Treatment is directed to the cause. Heat to the abdomen and large doses of atropine are of value in relaxing the spasm.

Foreign bodies including gall stones, enteroliths, pieces of gauze, etc., are removed by single enterotomy, although if the bowel is gangrenous or badly ulcerated it should be resected.

Benign tumors are fibroma, myxoma, lipoma and adenoma, usually project into the lumen of the gut as polyps, the treatment of which is to resect that portion of the intestine.

Intussusception should be first treated by enema and gastric lavage, if this does not relieve the condition, a laparotomy should be done, and

the telescoped portion of the bowel withdrawn. Chronic intussusception should be resected.

When a surgeon meets with a case of post-operative obstruction, he is indeed facing a rather strenuous crisis. In all probability the patient has just experienced an ordeal which has put his mental faculties to an extreme test, and then to have to submit to further operative procedures is an apparently almost unsurmountable barrier. This calamity is, fortunately, due to our wider knowledge of abdominal surgery, much more infrequent than formerly.

CONCLUSIONS.

1. Each case of intestinal obstruction is an individual surgical problem.

2. The possibility of rupture at the point of the obstruction must not be overlooked.

3. Difficulty may be experienced in making a diagnosis, especially in post-operative cases.

4. Definite diagnosis is not necessary before operative measures are begun.

5. Early diagnosis is the most important factor in the category.

6. One is too largely influenced, perhaps, in delaying operation in post-operative obstructed cases.

CASE REPORTS.

Two cases of adyanamic ileus following operation:

Case I. First day after operation the patient was doing well. Temperature 99; pulse 108; resp. 16. Had no abdominal distention.

Second day. Temperature 100°, pulse 118, resp. 18. Some distention was noted. Enema returned clear with much flatus expelled. Patient vomited brown fluid.

Third day. Morning two enemas were given and considerable fecal matter returned with both, also some gas. Patient distended with gas to a moderate degree. When seen at 4 p. m., the patient wore an anxious expression and was extremely restless. Pulse was thready—150 per min., resp. 22, temp. 99. Extremities were cold and clammy.

Enterostomy was done under local anesthesia in patient's room. Condition improved at once, and patient had an uneventful recovery. Returned home 17 days after operation and is well today.

Case II. Patient with ruptured right tubal pregnancy removed got along very nicely for the first three days. At this time she vomited black vomitus. Enemas given returned with no results. Stomach was washed out. On the fourth day the patient gave all the signs of obstruction. Enterostomy was done under local anesthesia. There was no vomiting after operation, and condition improved. Patient was discharged, well.

Case III. Two cases of chronic obstruction due to chronic inflammatory stricture.

A boy, 5 years, 3 months old, gave a history of attacks of colic since he was two years old. During attacks of pain morphine was given hypodermically. At operation a large dilated bowel presented which was delivered. The lower end of the bowel at the point of the obstruction was about the size of a lead pencil in diameter and gave the feeling of a rope between the fingers. Eighteen inches of bowel had to be resected in order to get fairly normal bowel. The patient made uneventful recovery, and left the hospital on the fifteenth day. At this time, which is three years since the operation, the child is perfectly well.

Case IV. A woman, 24 years of age, was operated upon for a stricture of the rectum two inches from external sphincter muscle. Operation was resection of the bowel with stricture including a good margin around growth. Several Wassermann tests were done, all of which were negative. Patient had a good recovery and condition permanently relieved.

Case V. An obstruction caused by a diverticulitis.

Patient had been complaining for 17 days with pain in abdomen. For the past three days has vomited everything taken by mouth, the last day vomitus has been fecal in character. Enemas returned clear. Operation was "Release of adhesions with drainage." Patient left hospital in good condition. Three months after operation patient reported in good health.

Case VI. Carcinoma of the pylorus.

A man, 50 years of age, giving a history of persistent vomiting, loss of weight. Physical examination was negative except a mass under costal margin just to the right of median line. Laprotomy was done and the pylorus with a growth the size of an orange was removed and a gastro-enterostomy done. Two years later patient reported well except for certain amount of indigestion.

Case VII. Case due to a band of adhesions.

Obstruction had continued for four days before entering hospital. Vomitus had been fecal

in character for the past two days. Operation was "Release of the band of adhesions." Bowel was very much discolored and mottled in appearance, so an enterostomy was done, and the bowel irrigated with normal salt solution. Patient returned home 22 days after operation. Up to date patient is in excellent health.

Case VIII. Obstruction due to a gall-stone. Diagnosis was made before operation. A simple enterotomy was done. Patient had an uneventful recovery.

Case IX. Obstruction due to a piece of gauze. Enterotomy was done. Patient had a good recovery.

Case X. Volvulus of three days' duration which had become gangrenous. Bowel drained and brought out of the abdomen forming an artificial anus. Patient died 52 hours after operation.

PROPAGANDA FOR REFORM.

Liquid Petrolatum as a Laxative.—Liquid petrolatum is indigestible. It is not absorbed, and, therefore, cannot produce poisoning. In ordinary quantities the administration of liquid petrolatum does not seriously impair the alimentary efficiency. Like all laxatives used in very large quantities, liquid petrolatum may diminish the degree of utilization of food by promoting evacuation before the functions of digestion and absorption can be entirely completed. Liquid petrolatum may produce gastric distress and, therefore, should be taken in a way to interfere least with gastric digestion by administration before bedtime or an hour before meals. In reporting on a proprietary brand of liquid petrolatum widely exploited to the public, the Council on Pharmacy and Chemistry warned that constipation should be treated by dietary and hygienic means, as evacuants are but temporary measures. It further cautioned that liquid petrolatum is medicinal: it modifies greatly the intestinal flora; it acts as a lubricant and emollient; it modifies the absorptive powers of the intestinal mucous membrane; it is capable of influencing the digestion of fats; and, in short, liquid petrolatum is a drug, the indiscriminate and excessive use of which should not be encouraged. (*Jour. A. M. A.*, December 1, 1923, p. 1896.)

Spahlinger Treatment for Tuberculosis.—Spahlinger is a resident of Geneva who received medical training but took his degree in law. Later he abandoned law for research work. The Spahlinger treatment makes use of vaccine and serum therapy. The theories from which the treatment is evolved is that the tubercle bacillus emits different toxins under varying conditions of temperature, environment, etc. Many of these are claimed to be isolated as either exotoxins or endotoxins. The vaccines — of which there are said to be about twenty—are used for prophylaxis for treatment of the milder cases of tuberculosis and for the production of the various serums used in the treatment of the more severe cases. It has been reported that the British ministry of health is prepared to encourage the experimental trial of the Spahlinger preparations under scientific supervision. The British Red Cross has appropriated money to enable Spahlinger to work on a larger scale in the production of his preparations. The reports in regard to the efficacy of the preparations which have appeared in British medical journals are conflicting, and the Red Cross organization has made it clear that the products are in the experimental stage. (*Jour. A. M. A.*, December 1, 1923, p. 1896.)

"A" Formula or "The" Formula?—When the proprietary evil in the United States was at its worst, a common piece of advertising deceit was that of the fake formula. On its face, such a "formula" was impressive—at least to those who were not chemists. After the American Medical Association created its own chemical laboratory, the Association chemists demonstrated repeatedly the absurdity of the serio-comic chemistry of some of the pharmaceutical manufacturers. It was not long before the crude chemistry and cruder dishonesty of pharmaceutical concerns began to disappear. Yet today there are still a few firms which endeavor to lend plausibility to their wares by resurrecting old methods. The report of the Council on Pharmacy and Chemistry on Gly-So-Iodonate brings out that a formula, both qualitative and quantitative, appears on the label of the preparation. The formula is absurd and impossible, and the A. M. A. Chemical Laboratory found that some of the ingredients were not present in the amount claimed. (*Jour. A. M. A.*, December 22, 1923, p. 2118.)

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NEW STUDIES OF SOME WIDELY USED DRUGS.

The modus operandi of some of the most useful and long valued drugs is still under debate. With the elevation of pharmacology to a dignified position among the medical sciences, a more critical consideration of reputed medicinal agents has been inculcated so that much of the dross of inherited beliefs is gradually being eliminated. This does not mean that so-called modern scientific medicine promptly waves aside all that it cannot explain, or that it ventures to discard as useless every reputed remedy that has failed to disclose a tenable mode of therapeutic action to the pharmacologic investigator. He would be rash, indeed, who overlooked or undervalued the great importance of empiric experience in therapy. How often has the newer knowledge merely confirmed the rationality of older practices that owed their genesis to circumstances in which ultramodern scientific considerations played no part whatever. Thus, the use of cod liver oil antedated by a century the discovery of fat-soluble vitamins. Pharmacology endeavors, rather, in many cases to test the alleged theories of pharmacodynamic action and to discard those that are proved untenable. Such destructive criticism often leads to progress quite as well as do more positive indications of physiologic potency. This may lately be noted in the study of a group of substances, notably salicylates, cinchophen, neocinchophen and related products, that find a wide-spread, growing application in therapy. The latest (1923) edition of Useful Drugs, prepared under the direction and supervision of the Council on Pharmacy and Chemistry of the American Medical Association, speaks of the drugs mentioned as "highly efficacious" and "exceptionally efficient" in the management of certain phases of arthritis. The assumption that the drugs exert an etiotropic action by destroying bacterial agencies responsible for the disease has repeatedly been disproved. They do not function as germicides, for example, in rheumatic fever assumed to be caused by microorganisms. Recently, Hanzlik and Tainter[1] of the Stanford University Medical School have observed that the so-called antiphlogistic action of the drugs referred to, as exemplified in the prompt amelioration of the objective signs of

1. Hanzlik, P. J., and Tainter, M. L.: Comparative Antiphlogistic Effects of Salicylate, Cinchophen and Neocinchophen in Experimental Edema of the Head and Neck, J. Lab. & Clin. Med. 9:166 (Dec.) 1923.

inflammation, including the swelling and edema of the joints, is not due to a direct action on the inflammatory process. Experimental edema of the head and neck in animals was not beneficially influenced by previous and simultaneous treatment of the animals with sodium salicylate, cinchophen or neocinchophen in large doses corresponding to the clinical "toxic" dosage used in the treatment of acute rheumatic fever. Negative results with respect to antiphlogistic effects have also been observed in the treatment of other kinds of edemas. Consequently, the Stanford pharmacologists conclude that the beneficial therapeutic effects of these drugs in rheumatic fever appear to be produced neither through etiotropic nor organotropic, but rather through symptomatic action, the benefits being mediated through antipyresis and analgesia. It is always well to know precisely what may and what may not be expected of drugs.—*Jour. A. M. A.*

THE COMMON COLD, AGAIN.

The "common cold" is one of the commonest of diseases, and there are few about which so little of a definite character is known. From time to time there is a recrudescence of theories as to the causes of common colds; then comes the period of some special form of therapeutic attacks based on the newest hypothesis; whereupon the vaunted treatment falls into desuetude. It is unfortunately easy to secure "evidences" of efficacy for all manner of proposed reliefs for mild, self-limiting disorders. The cure follows; *post hoc ergo propter hoc*. The extreme enthusiasts for the alleged microbial causation of the common cold have no ear for other possible factors in its incidence; and consequently they must marshal all the antibacterial forces of medicine to combat the cold. Sometimes the superior direction is given to isolation; or again to local antisepsis, or finally to vaccine therapy. It is, however, admittedly a hidden foe that they are trying to subdue. Whether it may appear in the guise of a simple bacillus or in the more evasive form of a filtrable virus no one has really discovered. The cocksureness of the advocates of the theory of infection may be illustrated by a quotation from a recent popular estimate of the subject. "This much we are certain of already: that the majority of so-called 'colds' have little or nothing to do with exposure to a low temperature, that they are entirely misnamed, and that a better term for them would be 'fouls.' In fact, this proportion can be clearly and definitely proved and traced as infections spreading from one victim to another. The best place to catch them is not out-of-doors, or even in drafty hallways, but in close, stuffy, infected hotel bedrooms, sleeping cars, churches, and theaters." [1]

Let us admit promptly and frankly that it is not difficult to defend the infection hypothesis; and we may perhaps recall without prejudice that it was once defended for beriberi and for pellagra with comparative success. But a malady that entails so much human discomfort, gives such dangerous opportunities to secondary invasions, and interferes so often with personal plans as does the common cold deserves critical study. It cannot be dispelled or averted by offhand pronouncements. Perhaps it will be worth while to listen to an occasional reactionary comment, such as Jordan[2] and his associates at Chicago have recently expressed. Statistical and laboratory data gathered by them from more than two thousand university students in different parts of the United States indicate to these investigators that the common cold is not a simple type of infection, perhaps in some instances not even an infectious process at all. They assert that numerous factors are undoubtedly concerned in the production of a cold; and their evidence does not support the view that a cold is always due primarily to the entrance of some virus from without the body. On the contrary it appears to them that internal body changes may be the more important factors. These changes are in turn associated closely with outside influences. This general conclusion is not out of harmony with the recently reported experiments of Olitsky and McCartney[3] at the Rockefeller Institute for Medical Research, who have apparently produced typical symptoms in healthy persons by using as an incitant a filtrable agent obtainable from the nasopharyngeal washings of patients during the very early hours of the onset of a cold. For they also stated that transmission failed in cases in which the colds were caused by exposure to the elements, or chilling the body, and not by definite contact with other cases of common colds.

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1. Hutchinson, Woods: Preventable Diseases, Boston, Houghton, Mifflin Company.

2. Jordan, E. O.; Norton, J. F., and Sharp, W. B.: The Common Cold, J. Infect. Dis. 33:416 (Nov.) 1923.

3. Olitsky, P. K., and McCartney, J. E.: Studies on the Nasopharyngeal Secretions from Patients with Common Colds, J. Exper. Med. 38:427 (Oct.) 1923; The Common Cold, editorial, J. A. M. A. 81:1697 (Nov. 17) 1923.

The Chicago bacteriologists have not hesitated to jeopardize the security of some further beliefs of the satisfied hygienists. "Resistance building" has been a favorite tenet in the prophylactic doctrine. The cultivation of an excellent physical condition through exercise, the habit of sleeping with open windows amid all rigors of climate, the frequent use of the cold bath—these are some of the practices expected to lessen the liability to respiratory disorders. Yet the Chicago statistics suggest that exposure to cold and the other lauded preventive measures are by no means as successful as they are supposed to be; nor do the data show that operations on the nose or throat result in marked reduction in the frequency of colds. Various investigators in recent years have failed to find any one species or group of bacteria to predominate in the upper respiratory tract during a cold. We may repeat our own earlier statement[3] that evidently there are colds and colds. To this we may now add the conservative conclusions of Jordan, Norton and Sharp.[2] Whether or not a cold is the result of a specific infectious process is unknown. It is clear, however, that outside influences, particularly those involving the chilling of the body, may serve, they say, to induce a cold, even if these influences cannot be regarded as the most important etiologic factors.—*Jour. A. M. A.*

DEFECTIVE EYESIGHT.

Millions of school children are handicapped in their studies by defective eyes. Thousands of children are suffering from eyestrain and large numbers are forced to discontinue their endeavors to acquire an education because of this same physical defect. It has been proven conclusively that poor eyesight is an important associate cause of backwardness, stupidity, apparent laziness and truancy.

A survey of statutory provisions in the United States and Territories for testing the sight of school children has been made by the Eye Sight Conservation Council of America, Times Building, New York City. The results of the study are published in report form in Eye Sight Conservation Bulletin No. 4.

The report estimates that at this time the number of school children enrolled in the elementary and secondary schools of the United States exceeds 24,000,000, or over 20 per cent of the population. More than 60 per cent of this number are said to have eye defects of sufficient degree to warrant correction.

Even simple visual tests reveal 25 per cent with manifest defects and symptoms of eyestrain. Many are contending with vision so defective that mental development is seriously retarded and comfort, health and even safety are jeopardized. Fully 6,000,000 of our school children are at a disadvantage in their efforts to gain an education.

Conclusions set forth in the report, applying to the country as a whole, point out that there is a wide diversity in the provisions and regulations. It was found that statutory provisions for the examination of the eyes of school children have not been adopted generally by State Legislatures, and that only twenty states have statutes providing for eye tests. There are only two other states that have board regulations which take the place of statutes. In most instances general physical examination laws are not interpreted to include eye tests.

Most existing statutes are regarded as inadequate. In only thirteen states are the laws mandatory for all school districts. Separate sections dealing exclusively with eye tests are found on the statutes of but six states and in conjunction with tests for hearing in only three others. There is often a delegation of dual responsibility upon Boards of Health and Education or authority is not clearly defined. The necessity for keeping records and reporting results to a designated state department is generally overlooked. Suitable provisions are not made for training teachers, school nurses, or health inspectors in the methods of making tests.

The laws are not generally enforced. A systematic effort is being made to enforce the laws in only eight states. There is practically no state supervision in at least thirty-three states and four territories, and very little in seven others. A conservative estimate based upon an analysis of the returns would be that less than one-third of the school children of the entire country are receiving visual tests. The word "mandatory" has no significance in many instances.

The conclusions indicate that no law is required and generally that it is not the existence of laws but the disposition and proper appreciation of authorities for the need for eye tests that is responsible for the commendable work that is being done in a few states and in certain communities.

The report is published "as an argument that every state and territorial possession should recognize the importance of the care of the eyes of its future citizens, that tests for defective vision may be carried out advantageously by teachers in the schools with a negligible expenditure of time, money and effort; and that State Boards of Education should consider it their duty to approve and provide regulations, instructions and the necessary appliances and to so supervise the work that all school children shall receive the attention that is their right."

A program is recommended for state educational departments, local school authorities, educators and teachers. Every State Board of Education is urged to bring about the observance of an Eye Sight Conservation Day.

The responsibility lies with the State Board of Education, which "should issue mandatory regulations providing for the conduction of eye tests in every urban and rural school in the state." In nearly all states little is being done outside the larger cities. There is pressing need for eye conservation in the smaller towns and in the rural districts as a part of the general plan to improve country life. Cooperation of State Boards of Health is advocated.

A definite and concise program for establishing tests of eyesight on a state-wide basis is presented. Such tests will not be made throughout the states unless mandatory regulations are issued by the State Departments of Education.

Teachers are urged to observe periodically an Eye Sight Conservation Day. The council issues instructions which enable teachers to make visual acuity tests satisfactorily.

The report contains detailed summaries of the state provisions for eye tests and the extent to which the making of tests is being supervised by state authorities.

The facts upon which the report was based came from Commissioners of Education and Commissioners of Health of every state in the Union, the District of Columbia, the Panama Canal Zone, the territories of Alaska and Hawaii, and Porto Rico and the Philippine Islands.

INVESTIGATION OF RESPIRATORY DISEASES.

Surgeon General Cumming, United States Public Health Service, says that respiratory diseases such as colds, influenza and similar conditions are responsible for a great deal of suffering, loss of time, disability and a not inconsiderable number of deaths. There are few, if any, individuals who do not suffer from some acute respiratory condition at least once a year, losing from a day to a week or more as a result, to say nothing of the miserable feeling which such condition entails. Some of these attacks develop into chronic sinus inflammations, middle ear disease leading to deafness, mastoid disease, occasionally meningitis, and at times a latent pulmonary tuberculosis is lighted up as a result of one of these acute disorders.

The United States Public Health Service is undertaking a detailed study of common colds and other minor respiratory diseases and influenza in an effort to gather morbidity data over a sufficient period of time and over a large enough geographical area to render these studies of value in attempting to prevent these affections. Comparatively little is definitely known as to the real causes, distribution, manner of spread, and epidemiology of these so-called minor respiratory ailments, nor of inter-epidemic influenza, because these diseases do not appear in ordinary morbidity reports. These studies are the first of their kind to be taken up on such a broad scale.

To collect these respiratory histories, both negative and positive, certain groups of colleges have been selected where active cooperation has been obtained by circularizing and enlisting the support of the students in reporting to the Public Health Service twice a month their respiratory experiences—whether or not they have had colds, bronchitis, tonsillitis, or influenza, for the two weeks' period covered by the report. Preliminary data are also collected relative to the incidence of influenza among those reporting, during the 1918 epidemic, whether or not they have been subject to chronic nose and throat trouble, the nature of underwear worn, ventilation of quarters during sleeping hours, and the like.

This work will be actively undertaken at Harvard University, Boston, John Hopkins Medical School, in Baltimore, Georgetown and Howard Universities, of Washington, Tulane University, of New Orleans, Ohio State University of Columbus, University of Chicago at Chicago, and the University of California at Berkeley. By this selection of colleges, groups of individuals living in all sections of the United

States will be enlisted and comparative studies made relative to the true occurrence of common colds and, among other things, influenza, at the places mentioned. It is hoped to determine the relation that the common cold bears to influenza.

It is anticipated that these studies will extend over a period of two or three years, and that the results will give a more definite idea of the epidemiology of respiratory disorders.

NEW AND NONOFFICIAL REMEDIES.

NATIONAL RADIUM EMANATOR.—A portable appliance for activating water with emanation; the emanation is emitted from a solution of radium chloride, barium chloride and sodium chloride. The appliance is claimed to produce 40 microcuries (150,000 Mache units) of radium emanation to 1,000 c.c. of water daily. The actions, uses and dosage of radium are discussed in New and Nonofficial Remedies, 1923, p. 255. National Radium Products Co., New York. (*Jour. A. M. A.*, December 8, 1923, p. 1953.)

IODOSTARINE-ROCHE.—DIIODOTARIRIC ACID.—An iodine addition product of tartaric acid, derived from the fruit of a species of Picramnia. Iodostarine-Roche contains 47.5 per cent of iodine. It acts in the tissues similarly to inorganic iodides. It is not broken up in the stomach, but a portion of the iodine is split off when it enters the intestine. The undecomposed portion is readily absorbed and, as in the case of other fats, is largely deposited in the tissues where it is slowly split up. The action of iodostarine-Roche is exerted more slowly than that of the inorganic iodides. Iodostarine-Roche is supplied in the form of tablets iodostarine-Roche 0.25 gm., and as chocolate tablets iodostarine-Roche containing iodostarine-Roche equivalent to iodine 0.01 gm. Hoffmann-LaRoche Chemical Works, New York. (*Jour. A. M. A.*, December 15, 1923, p. 2032.)

TETANUS ANTITOXIN FOR HUMAN USE-CUTTER.—Tetanus antitoxin, concentrated (see New and Nonofficial Remedies, 1923, p. 284), marketed in syringes containing 1,500 and 5,000 units each. Cutter Laboratory, Berkeley, Cal.

DIPHTHERIA TOXIN-ANTITOXIN MIXTURE-CUTTER. — Diphtheria toxin antitoxin mixture (see New and Nonofficial Remedies, 1923, p. 284), each c.c. representing 3 L+ doses of diphtheria toxin neutralized with sufficient antitoxin to conform to the toxicity requirements of the U. S. Public Health Service. It is marketed in vials containing, respectively, 1 c.c. and 50 c.c., and in syringes containing one immunizing treatment. Cutter Laboratory, Berkeley, Cal.

ANTI-ANTHRAX SERUM FOR HUMAN USE-CUTTER.—An anti-anthrax serum (see New and Nonofficial Remedies, 1923, p. 287), marketed in double-ended vials containing 50 c.c. for intravenous injection. Cutter Laboratory, Berkeley, Cal.

RABIES VACCINE-PASTEUR (CUTTER). — An anti-rabic vaccine (see New and Nonofficial Remedies, 1923, p. 294), prepared according to the method of the Hygienic Laboratory of the U. S. Public Health Service. The emulsion from the cord is shipped daily and is diluted at the time of injection. The treatment consists of 21 daily injections. Cutter Laboratory, Berkeley, Cal.

DIPHTHERIA TOXIN FOR THE SCHICK TEST-CUTTER.—A diphtheria immunity test (see New and Nonofficial Remedies, 1923, p. 323), marketed in packages of two vials, one containing diphtheria toxin and the other physiologic solution of sodium chloride for dilution. Cutter Laboratory, Berkeley, Cal.

CAPSULES CARBON TETRACHLORIDE (human use)—P. D. and Co.—A brand of carbontetrachloride-N. N. R. It is marketed in capsules containing 20 minims. Parke, Davis and Co., Detroit.

ELIXIR OF VERONAL.—Each fluid drachm contains veronal (see New and Nonofficial Remedies, 1923, p. 63) 2 grains in a menstruum containing alcohol 33.5 per cent. Winthrop Chemical Co., New York.

DIPHTHERIA TOXIN-ANTITOXIN MIXTURE (see New and Nonofficial Remedies, 1923, p. 284) containing in each cubic centimeter 0.1 L+ dose of diphtheria toxin neutralized with the required amount of diphtheria antitoxin. Marketed in packages of three vials, each containing 1 c.c.; and in vials containing, respectively, 10 c.c. and 20 c.c. of the mixture. E. R. Squibb and Sons, New York. (*Jour. A. M. A.*, December 22, 1923, p. 2115.)

SCARLET RED MEDICINAL-"NATIONAL." — A brand of scarlet R. medicinal Biebrich-N. N. R. For a discussion of the actions, uses and dosage

of scarlet R. medicinal Biebrich, see New and Nonofficial Remedies, 1923, page 275. National Aniline & Chemical Co., New York. (*Jour. A. M. A.*, August 18, 1923, p. 548.)

PUBLISHER'S NOTES.

AMERICAN ARSPHENAMINES NOW THE WORLD'S STANDARD.

A few years ago there was not a gram of arsphenamine made in this country, not a gram. We were abjectly dependent on other countries four our supply of this very important drug.

Now, thanks to the Dermatological Research Laboratories, of Philadelphia, we are in a different and more complacent position. Not only is arsphenamine now being made in America in quantity sufficient for all needs, present and future, but the quality is such as the world has never before known. As the result of researches and refinements in the manufacture of the drug, we now have an arsphenamine of greatly enhanced effectiveness, along with a greater margin of safety for the patient, than any of the imported drugs afforded.

As for neoarsphenamine, the first supplies of which also came from Europe, the circumstances are much the same. A very superior quality of drug, in fact the best drug known to syphilologists, now comes from the Dermatological Research Laboratories, branch of The Abbott Laboratories, Chicago. It has been endowed by chemists with a trypanocidal activity almost if not quite that of arsphenamine, whereas originally the activity of this related arsenical was considerably less.

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